

REMARKS

This application contains claims 1-42. Claims 10-14, 25-29 and 38-42 are allowed. Claims 1-4, 6, 8, 15-18, 20, 22, 30-33, 35 and 37 have been amended. No new matter has been added. Reconsideration is respectfully requested.

Claims 1, 2, 7, 9, 15, 16, 21, 23, 30, 31 and 36 were rejected under 35 U.S.C. 102(b) over Li et al. (U.S. Patent 5,504,319). Applicant has amended independent claims 1, 15 and 30 in order to clarify the distinction of the present invention over Li. Dependent claims 2, 16 and 31 have also been amended for proper antecedent dependence from claims 1, 15 and 30, respectively.

Li describes a method and system for barcode acquisition based on dividing an image into windows and analyzing gray level statistics to determine which of the windows may contain parts of the barcode. The windows that are believed to contain parts of the barcode are clustered, and the orientation of the barcode is estimated based on the shape of the cluster (col. 3, lines 37-52).

The statistical tests applied to each window, which Li refers to as "Candidacy Tests," include a Contrast Test, a Balance Test and a Transition Count Test (col. 4, lines 4-5). None of these tests actually identifies barcode stripes within a given window. Rather, each of Li's tests "assumes that bar codes are made up of black and white stripes" (col. 4, lines 12-13), and then checks that the overall statistical properties of the window correspond to the expected statistical properties of a striped pattern. The Contrast Test calculates the contrast of the window as the difference of gray levels between the brightest and darkest pixels in the window (col. 4, lines 19-21). The Balance Test determines the relative numbers of dark pixels and bright pixels in the

window (col. 4, lines 50-58). The Transition Count Test calculates the number of pixels in the window that are characterized by high transition strength, i.e., large differences between the gray level values of neighboring pixels (co. 5, lines 5-14). Since barcode windows are expected to have high contrast and high transition count and to be well balanced, windows that do not meet these criteria are eliminated from consideration. Windows passing these statistical tests are classified as "candidate windows."

To estimate the orientation of the barcode, Li clusters together contiguous candidate windows (col. 5, lines 21-25). To find an "aim line" for reading the barcode, Li assumes the barcode to be rectangular. He then finds the center of the cluster of windows and performs a linear fit to determine the longitudinal axis of the cluster passing through the center (col. 5, lines 50-63, and col. 6, lines 30-34, along with the intervening description). In other words, Li looks at the overall shape of the window cluster as a whole to find the barcode orientation. Nowhere does he actually identify the barcode stripes or analyze the orientations of the stripes within any of the windows in the cluster. As illustrated by barcode 122 in Li's Fig. 6, the aim line found in this manner depends on the cluster shape and may not actually be perpendicular to the stripes of the barcode. Since it is sufficient, for Li's purpose of reading the barcode, to use an aim line that is approximately aligned with the barcode axis, he has no need for or interest in finding the actual orientation angle of the stripes.

Amended claim 1 recites a method for locating a barcode in an image, based explicitly on detecting a pattern of stripes associated with the barcode in at least one tile of the image, and analyzing the pattern of stripes within the tile so as to determine their angle of

orientation. This angle is then used in defining the bounds of the barcode, which are assumed to be aligned with the pattern of the stripes. In other words, the method recited by claim 1 finds the barcode orientation from within: it first identifies the pattern and orientation of barcode stripes within a tile, and then uses this in-tile orientation as an indicator of the orientation of the entire barcode, in order to find the bounds of the barcode. In contrast to this method, Li finds the approximate outline of the barcode as an indicator of the aim line direction. He neither teaches nor suggests the possibility of analyzing the pattern of stripes within any of the tiles in order to determine their angle of orientation, as required by claim 1.

In view of this distinction, applicant respectfully submits that amended claim 1 is patentable over Li. Independent claims 15 and 30, which recite apparatus and a computer software product operating on principles similar to the method of claim 1 (and which have similarly been amended), are believed to be patentable for the same reasons as claim 1. In view of the patentability of these independent claims, dependent claims 2, 7, 9, 16, 21, 23, 31 and 36 are also believed to be patentable.

Claim 24 was rejected under 35 U.S.C. 103(a) over Li in view of Zlotnick et al. (U.S. Patent 5,737,439). In view of the patentability of claim 23, as argued above, claim 24, which depends from claim 23, is believed to be patentable, as well.

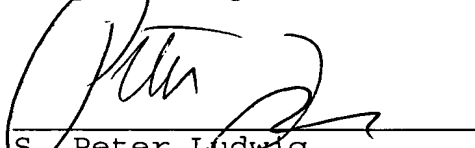
Claims 3-6, 8, 17-20, 22, 31-35 and 37 were deemed to recite allowable subject matter, but were objected to for depending from rejected base claims. (Note that claim 31 was listed both as rejected over Li and as reciting allowable subject matter, but applicant has assumed the latter classification of claim 31 to be in error.) Applicant has accordingly amended claims 3, 4,

6, 8, 17, 18, 20, 22, 32, 33, 35 and 37 to stand as independent claims, incorporating the limitations of the independent claims and intervening claims from they formerly depended. Claim 5 depends from claim 4; claim 19 depends from claim 18; and claim 34 depends from claim 33. Therefore, all of claims 3-6, 8, 17-20, 22, 31-35 and 37 are now believed to be in condition for allowance.

Applicant has studied the additional references cited by the Examiner and believes all the claims in the present patent application to be patentable over these references, whether taken individually or in any combination.

Applicant believes the amendments and remarks presented hereinabove to be fully responsive to all of the grounds of rejection and objections raised by the examiner. In view of these amendments and remarks, applicant respectfully submits that all of the claims in the present application are in order for allowance. Notice to this effect is hereby requested.

Respectfully submitted,



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